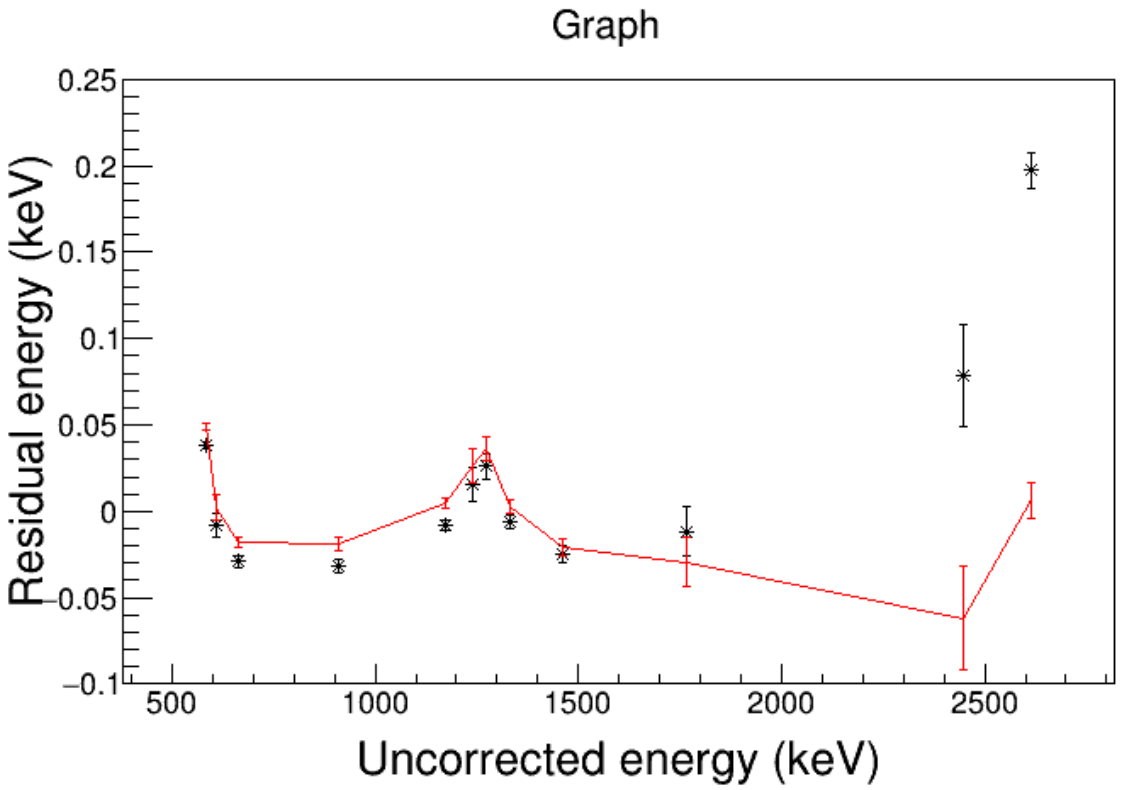
KU LEUVEN

Update muX meeting 25/08

Michael Heines

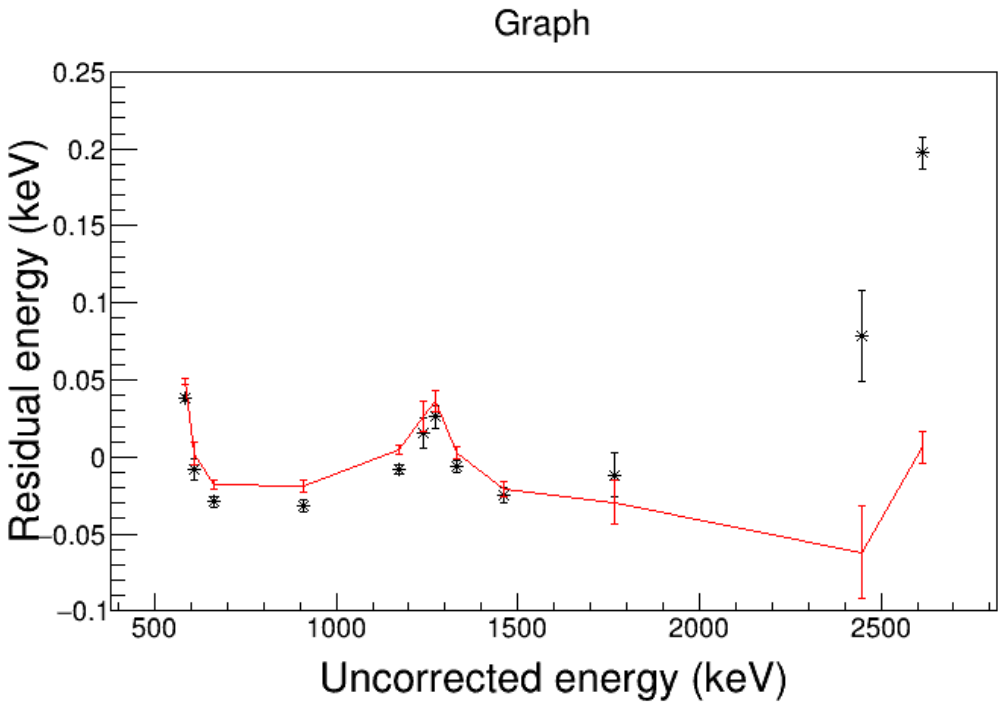
Final energy calibration

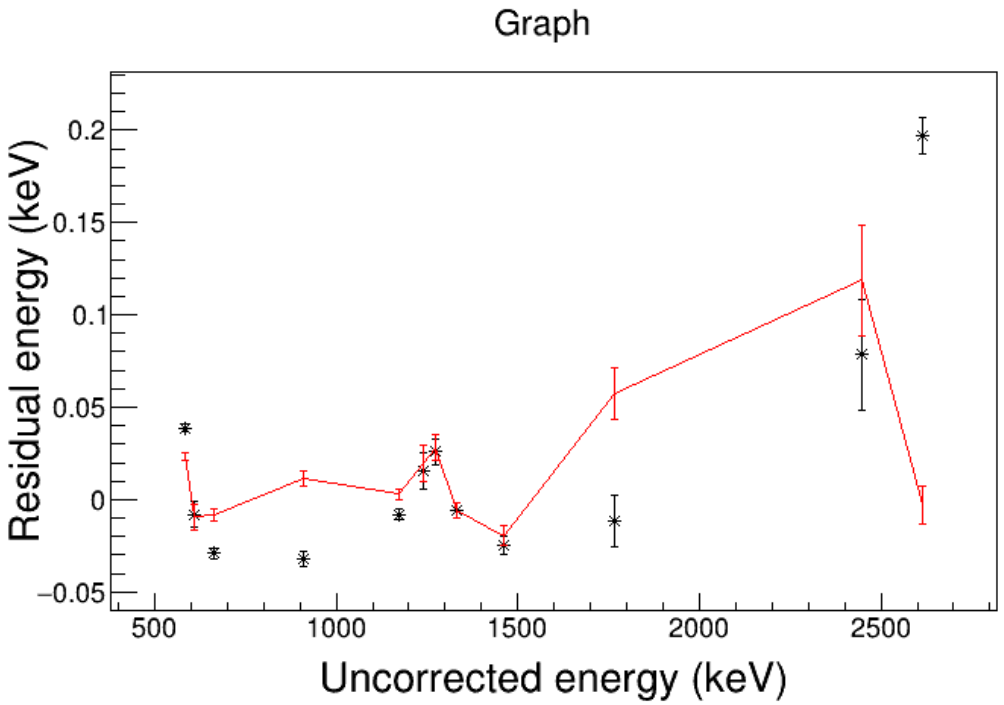
- After gain drift correction
- Additional background lines visible
- Fit with gaussian starting from -1 sigma
- Polynomial fit:
  - Quadratic still showed some trend
  - Cubic didn’t change much, fourth order



Final energy calibration

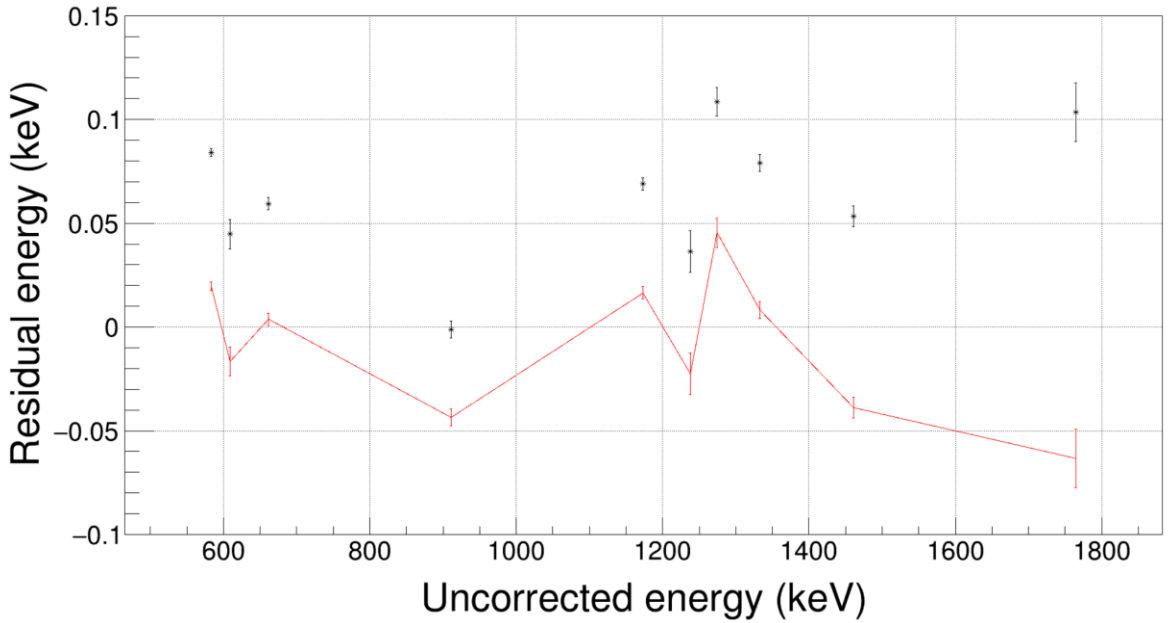
Black = before recalibrating
Red = after recalibrating





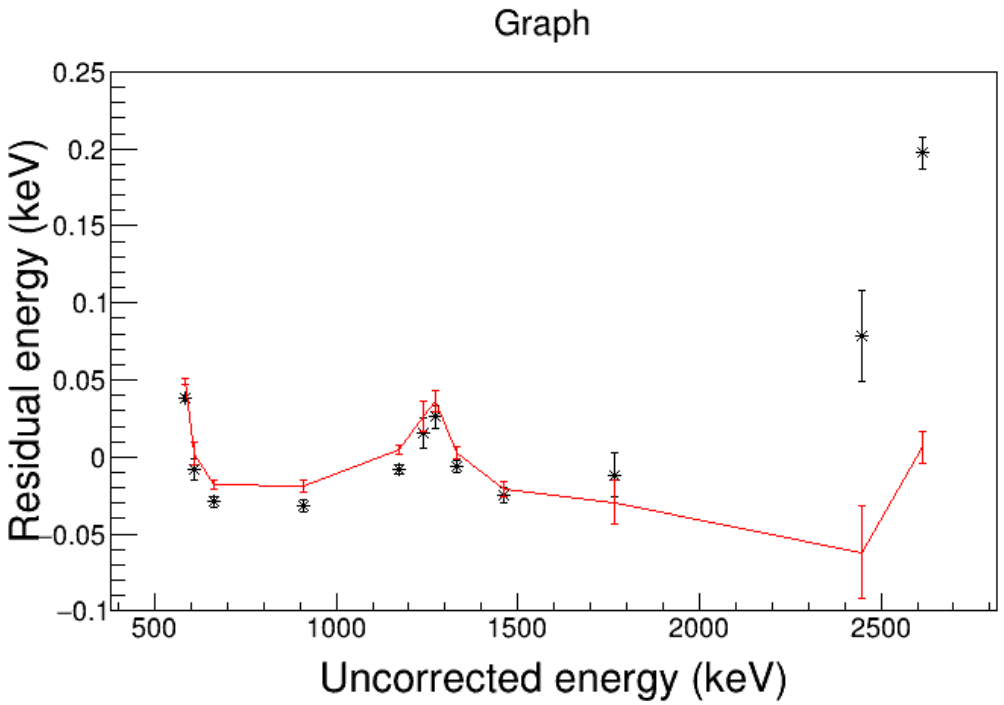
Calibrating with gaus+step+hypermet

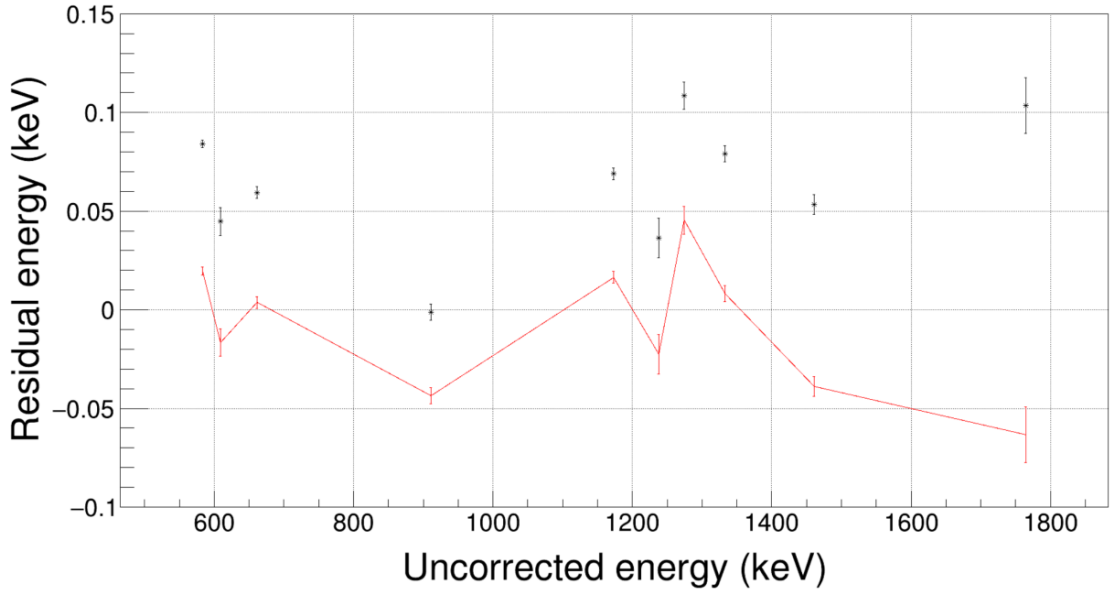
- Only went up to 1800 keV
- Stopped at quadratic term
- Differences
  - Roughly same peak-to-peak residual, but shifted by ~50eV
  - Some subtle differences
- Covariance matrix calculation shows < 3eV uncertainty at 700 keV → I do not trust this value



Comparison

If we have the Ag-110m source from Emilio, we will have a lot more calibration lines → Higher order polynomial possible

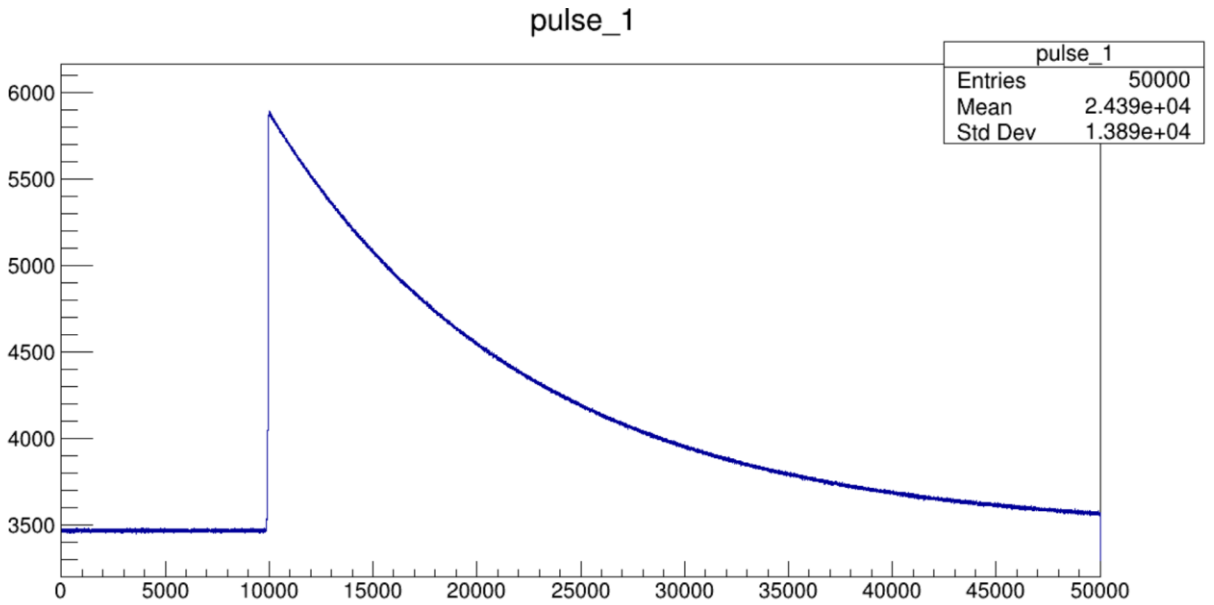




Trapezoid filter

- Try to reproduce struck trapezoid filter
- Fit tau on exponential tail
- Scan for peaking time and gap

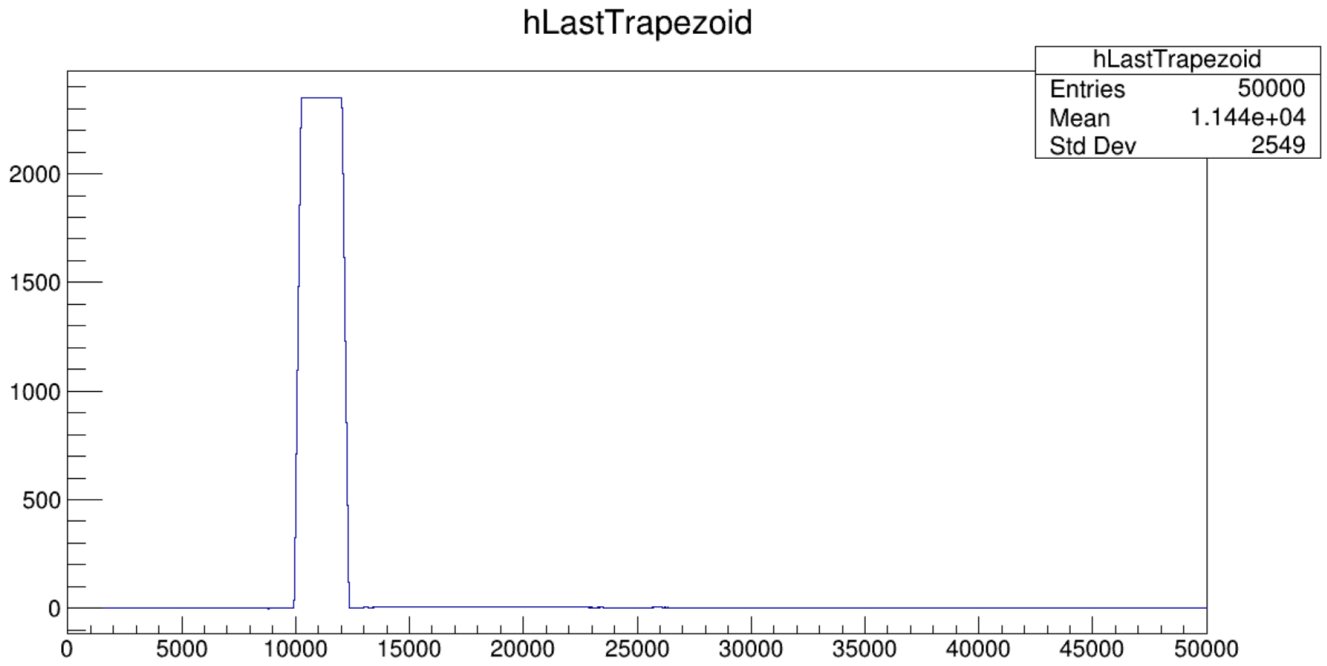
- Last week: data with 50k clock ticks (200 µs) using Y-88 with threshold around 1800 keV



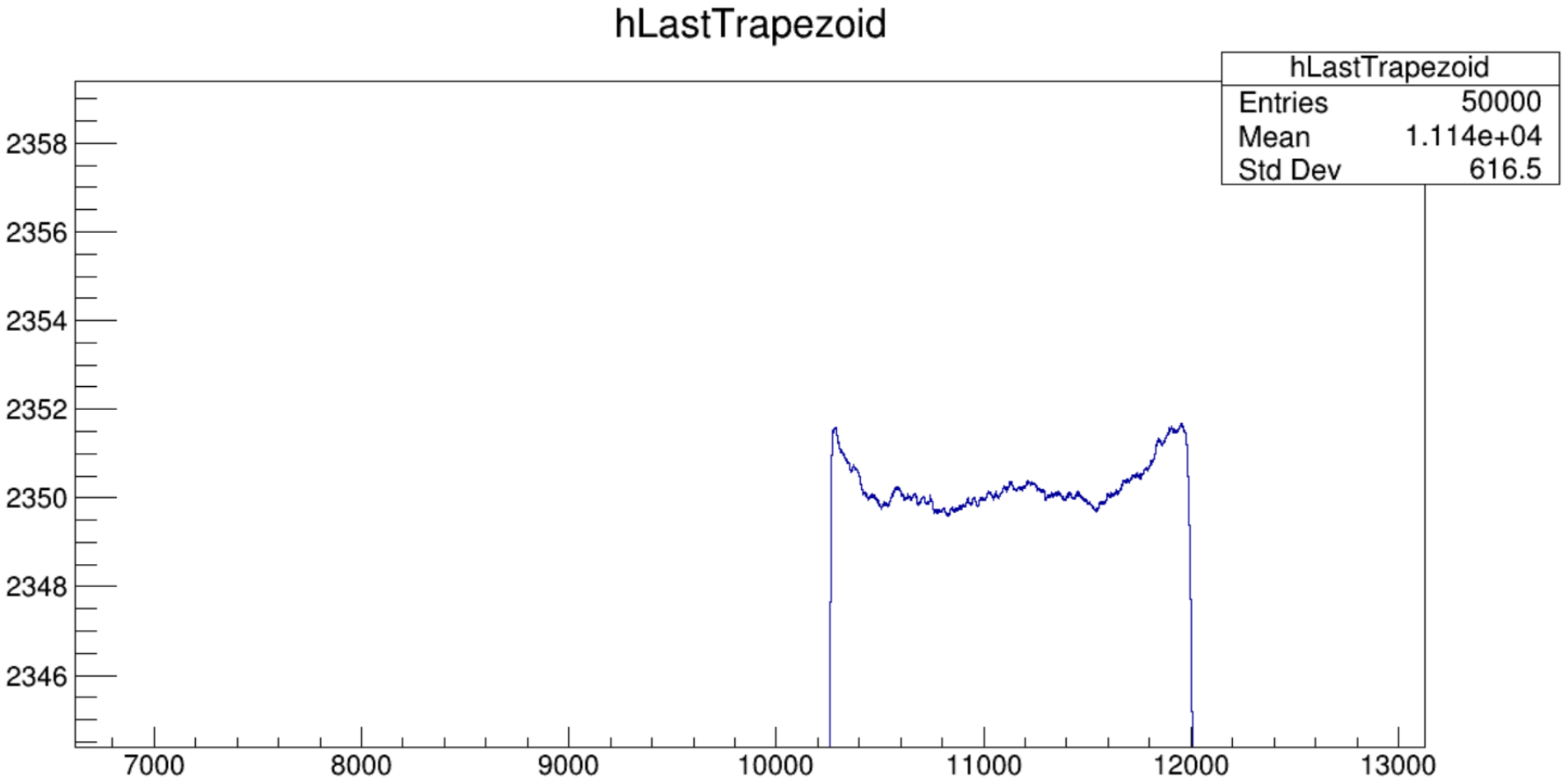
Fit tau

- Fit in narrow range right after the peak: 48.767(6) µs
- Fit in broader range longer after the peak: 49.94(14) µs

- Optimized value for flat top: 48.8 µs
- Compared flat tops and 48.8 is better



Very nice flat top (within ~2 channels)



Trapezoids: what's next?

- Don't fully reproduce values from struck yet (with same parameters)
- Mike said his code only had very small differences → Look for mistake in my code
- Scan 2D space of peaking time and gap parameters

Analyzer updates

- Addition to the existing ELET algorithm for exact mathematical extrapolation
- Tree writer can now also write raw germanium events for optimizing the trapezoid filter
- Bug fixes
- Any requests?

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